



Ecole Supérieure de Navigation

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Influence de la pression d'ouverture de l'injecteur et de la composition des acides gras d'un biodiesel sur la composition des gaz d'échappement en mettant l'accent sur la concentration de NO

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Mémoire présenté pour l'obtention
du titre de
Bachelor en Mécanique Navale

Promoteur : Raf Maes

Année académique 2020 - 2021

Abstract

Reducing fuel emissions is the subject of most research aiming to find the best way to continue using the modern means of transport, namely cars and boats while reducing the effects of pollution. However, the use of diesel causes high NO, NO₂ and PM, emissions and that is the reason why biodiesel is becoming a good alternative to diesel. Biodiesel can be produced in different ways with different raw materials as well, but we used rapeseed oil for this research. We experimented with seven biodiesels with different fatty acid compositions, with a biodiesel that has a normal fatty acid composition. The latter was our benchmark in terms of emissions. The variation of the injection pressure can also improve the quality of the emissions. Three pressure variations were made to see the effects on the emissions of our different biodiesels. We are therefore going to assess the effects of pressure on our various biodiesels, which all have different acid compositions. Our biodiesels are tested with a four-stroke single-cylinder direct-injection engine, with an electrical outlet power variations from 0 A to 16.65 A. As the load increases, the emissions also increase, so it becomes important to find a way to decrease the effect of emissions at high loads. Experiments show that the injection pressure has an influence on the emissions of different biodiesels when the load is considered, the higher pressure of 22.50 MPa has been found to have the best result in terms of emission. The fatty acid composition also plays an important role because among the seven biodiesels compounds, there were three that almost met emission expectations which were to be lower than the emissions of the benchmark biodiesel. Apart from NO emissions, we also experimented with NO₂ and PM emissions at a pressure of 22.50 MPa. The PM and NO₂ and NO results for the seven compound biodiesels were more or less around the benchmark biodiesel emissions, there were three that were almost always lower than the benchmark biodiesel emissions. This implies that the fatty acid composition also plays an important role as much as the pressure and the load.